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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/683,990	03/08/2002	Kadri Nizar Jabri	122167	2602
23413	7590	04/06/2004	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			KIKNADZE, IRAKLI	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/683,990

Applicant(s)

JABRI ET AL.

Examiner

Irakli Kiknadze

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,4,5,7,8 and 10-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4,5,7 and 10-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/01/2003
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

1. In response to the Office action mailed on September 2, 2003 the Amendment has been received on December 1, 2003.

Claims 1, 7, 10, 15, 23, 24 and 25 have been amended.

Claims 2, 3, 6 and 9 have been canceled.

Claims 1, 4, 5, 7, 8, 10 – 25 are currently pending in this application.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

3. Claims 1, 15, 17, 19, 23, 24 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "detector correction" in claims 1, 15, 17, 19, 23, 24 and 25 is a relative term, which renders the claim indefinite. The term "detector correction" is not defined by the claim, and one of ordinary skill in the art would not be reasonably appraised of the scope of the invention. The term "detector corrections" can be held indefinite because claim fails to state the function which is to be achieved and more than one effect can be implemented from the specification or the relevant art.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4, 5, 7, 8, 10 -15, 17, 19 - 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (US Patent 6,683,934 B1) in view of Jabri et al. (US Patent 6,661,873 B2).

With respect to claims 1, 4, 15, 17 and 19, Zhao teaches processing dual energy images of a subject (50) comprising: obtaining a first image generated at a first energy level; obtaining a second image generated at a second energy level different than the first energy level (column 1; lines 6-19); decomposing the first image and the second image to form a raw soft-tissue image and a raw bone image (column 7; lines 19-23), post-processing the raw soft-tissue image to form a processed soft-tissue image; post-processing the raw bone image to form a processed bone image; displaying the processed soft-tissue image and the processed bone image (Fig.1; column 7, lines 43-57). Zhao teaches noise reduction technique for dual energy imaging but fails to specify performing the soft-tissue and bone image noise reduction. Jabri teaches a variety of processing schemes: prior decomposition performing motion artifact corrections (column 7; lines 34-38) and after decomposition applying noise reduction to the soft tissue and bone images to provide higher quality images (column 7; lines 43-48). It

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would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Jabri in the method of Zhao, in order to provide improved quality dual energy image processing.

7. With respect to claims 5 and 8, Zhao teaches the claimed invention except for adjusting the contrast of the soft-tissue and bone images. Jabri teaches adjusting the contrast of the raw soft-tissue and bone image to minimize motion artifacts (column 8; lines 26-34). It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Jabri and incorporate them to the system of Zhao, in order to reduce motion artifacts and provide improved quality dual energy image processing.

8. With respect to claims 7 and 10, Zhao teaches the claimed invention except for processing edge enhancement of the soft-tissue and bone images. Jabri teaches edge enhancement technique of the raw soft-tissue and bone image to minimize motion artifacts (column 9; lines 37-39). It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Jabri and incorporate them to the system of Zhao, in order to reduce motion artifacts and provide improved quality dual energy image processing.

9. With respect to claims 11-14 and 20-22, Zhao teaches displaying any desirable processed image (column 6; lines 48-54).

With respect to claims 23 and 24, Zhao teaches dual energy imaging system comprising: energy means comprising an energy source generating photons at a first energy level and a second energy level (as an x-ray tube/generator (10)); detection

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means comprising a detector (10) generating a first image representative of the photons at the first energy level passing through a structure and a second image representative of the photons at the second energy level passing through the structure (50); storage means comprising a memory (60) for storing the first and second image; processing means comprising a computer (40); decomposing the first image and the second image to form a raw soft-tissue image and a raw bone image (column 7; lines 19-23), post-processing the raw soft-tissue image to form a processed soft-tissue image; post-processing the raw bone image to form a processed bone image; display (70) processing the processed soft-tissue image and the processed bone image (Fig.1; column 7, lines 43-57). Zhao teaches noise reduction technique for dual energy imaging but fails to specify performing the soft-tissue and bone image noise reduction. Jabri teaches a variety of processing schemes: prior decomposition performing motion artifact correction (column 7; lines 34-38) and after decomposition applying noise reduction to the soft tissue and bone images to provide higher quality images (column 7; lines 43-48). It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Jabri in the system of Zhao, in order to provide improved quality dual energy image processing system.

10. With respect to claim 25, Zhao teaches a computer program (column 8; lines 42-45) product for processing dual energy a storage medium readable by a processing circuit and storing instructions for execution by the processing circuit for: obtaining a first image generated at a first energy; obtaining a second image generated at a second energy different than the first energy level; decomposing the first image and

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the second image to form a raw soft-tissue image and a raw bone image; post-processing the raw soft-tissue image to form a processed soft-tissue image; post-processing the raw bone image to form a processed bone image; display processing the processed soft-tissue image and the processed bone image. (Fig.1; column 7, lines 43-57). Zhao teaches noise reduction technique for dual energy imaging but fails to specify performing the soft-tissue and bone image noise reduction. Jabri teaches a variety of processing schemes: prior decomposition performing motion artifact correction (column 7; lines 34-38) and after decomposition applying noise reduction to the soft tissue and bone images to provide higher quality images (column 7; lines 43-48). It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Jabri and incorporate them to the computer program product of Zhao, in order to provide improved quality dual energy image processing.

11. Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao et al. (US Patent 6,683,934 B1) in view of Jabri et al. (US Patent 6,661,873 B2) as applied to claim 15 above, and further in view of Nicolas et al. US Patent Application Publication 2002/0087074 A1.

With respect to claims 16 and 18, Zhao in view of Jabri, as applied to claim 15 above, teaches the claimed invention except for using cardiac gating to acquire the images at a first and second energy levels at a specific point in a cardiac cycle. Nicolas teaches (Fig.1) a method for imaging a patient in a dual energy X-ray imaging system. The system includes a heart cycle monitor (140) monitoring the cardiac cycle of a patient (110) to detect a cardiac trigger. Once the cardiac trigger has been detected, an

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X-ray emitter (120) emits high energy and low energy X-rays through the patient and an X-ray detector (130) detects the emissions and forms images. Further, the X-ray images are combined to form X-ray images that may then be employed for dual energy X-ray processing (see abstract). It would have been obvious to one of ordinary skill in art at the time of the invention was made to employ the teachings of Nicolas and incorporate them in the invention, Zhao in view of Jabri, combining several task dual energy image processing methods in order to provide better diagnostic imaging of the patient.

### ***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.



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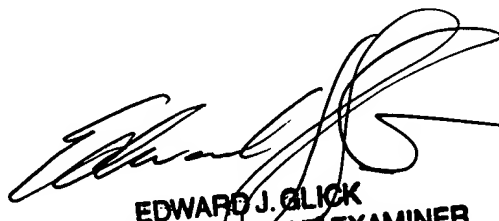
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Irakli Kiknadze whose telephone number is 571-272-2493. The examiner can normally be reached on 9:00- 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Irakli Kiknadze  
April 2, 2004

IK



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER